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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/716,493 | 11/20/2003 | Senta Tojo | 2018-805 | 6679 |
| 23117 | 7590 | 09/29/2004 | EXAMINER KITOV, ZEEV | |
| NIXON & VANDERHYE, PC 1100 N GLEBE ROAD 8TH FLOOR ARLINGTON, VA 22201-4714 | | | ART UNIT 2836 | PAPER NUMBER |

DATE MAILED: 09/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/716,493

Applicant(s)

TOJO ET AL.

Examiner

Zeev Kitov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4 - 6, 10 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 7 - 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>11/20/03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ricco et al. (US 5,532,526) in view of Jansen (US 5,491,623). Ricco et al. discloses following elements of Claim 1: an electromagnetic load drive circuit having a DC power supply (element 102 in Fig. 2) and a capacitive element (elements Ci in Fig. 2) as a power source feeding the power to the inductive element at the time of operating the load and recovering energy accumulated in the inductive element; the energy being recovered by the capacitive element at the time when the operation of the electromagnetic load is stopped (col. 4, lines 1 – 67). It further discloses control means (element 12 in Fig. 2) controlling the switching means to select the first state when the electromagnetic load is in operation so that the electric power is fed to the inductive element and the power source that are connected in series, and to select the second state when the operation of the electromagnetic load is stopped (col. 4, lines 1 – 67). It further discloses the first switching means (element SWr in Fig. 2) connecting the capacitive element to the power source. However, it does not disclose connection of the capacitive element to the power source in a first state such that the reference terminal of the capacitive element is

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connected to the terminal of the power source opposite to the reference terminal and to the reference terminal in a second state. Jansen discloses the voltage multiplier circuit, wherein the reference (bottom) terminal of the capacitive element (capacitor 40b in Fig. 1) is being connected to the power source (through switch 30a in Fig. 1) in a first state (when the charge of the capacitive element is transferred to the loading element) such that the reference terminal of the capacitive element is connected to the terminal of the power source opposite to the reference terminal (terminal V+ in Fig. 1) and to the reference terminal in a second state (through switch 40b in Fig. 1). Both references have the same problem solving area, namely charging/discharging the capacitive element. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Ricco et al. solution by adding the switching means functioning according to Jensen, because (i) as Ricco et al. state (col. 1, lines 14 – 27), for efficient control of the internal combustion engine injectors the supply current to the injectors must rise fast and fall fast and (ii) as well known in the art, increase of the voltage applied to the inductive element (doubling voltage) results in increased speed of the current rising.

Regarding Claim 4, Ricco et al. disclose a recovery line (lines with the diodes Di in Fig. 2) for recovering the energy accumulated in the inductive element by the capacitive element and having a diode (diodes Di in Fig. 2), which is forward biased to let the recovery current flow from the inductive element to the capacitive element.

Regarding Claim 5, Ricco et al. disclose a feeder line (line between the positive terminal of the battery and line 104 in Fig. 2) for feeding electric power to the inductive

element from the battery and having a diode (element D2 in Fig. 2), which being forward biased conducts the current.

Regarding Claim 6, Ricco et al. disclose a feeder line (line between the upper terminal of the capacitor and line 104 in Fig. 2) for feeding electric power to the inductive element from the capacitive element and having a diode (element D1 in Fig. 2), which being forward biased conducts the feeding current from the capacitive element to the inductive element (element Li in Fig. 2).

Regarding Claim 10, Ricco et al. disclose selection means for selecting any one of a plurality of the inductive elements (switches Swi in Fig. 2), and a recovery line (lines with the diodes Di in Fig. 2) for recovering the energy accumulated in the inductive element by the capacitive element and having a diode (diodes Di in Fig. 2), which is forward biased to let the recovery current flow from the inductive element to the capacitive element.

Allowable Subject Matter

Claims 2 and 3 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. A reason for that is that Claims 2 recites a limitation of the assisting capacitive element, which is being charged in the second state. Such limitation was not found in the collected prior art of the record.

Claims 7 – 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the

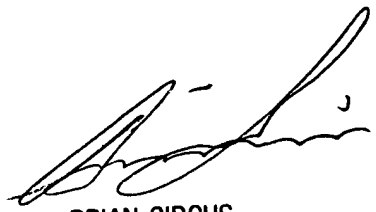
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base claim and any intervening claims. A reason for that is that Claim 7 recites a limitation of second switching means turning on and off at the time of the energy recovery by the capacitive element. Such limitation was not found in the collected prior art of the record.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose current telephone number is (571) 272 - 2052. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272 – 2800, Ext. 36. The fax phone number for organization where this application or proceedings is assigned is (703) 872-9306 for all communications.

Z.K.
09/23/2004



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